The larva of *L. texana* is carefully described by Townsend and differs from that of our common *L. decemlineata* by its pale straw color and by the absence of the series of baso-pleural spots of the abdomen. In this latter character it approaches the larva of *L. juncta*.

Leptinotarsa texana has generally passed among American entomologists under the name *defecta*. Mr. Schaeffer, who took both species at Brownsville, has demonstrated the distinctness of the two forms. Tower has recently added to the confusion by treating *texana* under the name *defecta* and quoting the localities given by Stål and Sallé for the true *defecta*. The following references may help to clear the confusion.

Leptinotarsa defecta Stål.

Myocoryna defecta Stål, Öfv. af K. Vet. Ak. Förh., 1859, p. 317.
Chrysomela defecta Stål, Mon. Chrys. de l'amérique, 1862, p. 165.
Leptinotarsa defecta Jacoby, Biol. Centr. Amer., Phytophaga, I, p. 234, Pl. XIII, fig. 21, 1892.
Leptinotarsa defecta Schaeffer, Bull. Brookl. Inst. Arts and Sci., I, p. 239, 1906.

Leptinotarsa texana Schaeffer.

Leptinotarsa defecta Linell, Jour. N. Y. Ent. Soc., IV, p. 196, 1896.
Leptinotarsa 11-lineata Townsend, Trans. Tex. Acad. Sci., V, pp. 82–84, 1903.
Leptinotarsa defecta Tower, Evolut. in Leptinotarsa, pl. 23, fig. 20, 1906.
Leptinotarsa texana Schaeffer, Sci. Bull., Brookl. Inst. Arts and Sci., I, p. 239, 1906.

BIOLOGICAL NOTES ON MEGILLA MACULATA DE GEER.

By A. Arsène Girault,

New Richmond, Ohio.

The following brief descriptive and biological notes on this lady-bird were obtained while making an attempt to keep many pairs in confinement through the several generations of a season, but which attempt failed because of the scarcity of food. There is included a description of the process of hatching, records of the period of incubation during portions of May and June, 1907, records of the larval and pupal instars for a single generation, and notes on adults kept in confinement, all of which are more or less fragmentary. The observations were made in the laboratory at New Richmond, Ohio, about latitude 38 degrees, 48 minutes north.

HATCHING.

Just previous to hatching, the eggs are dusky yellow, due to the inclosed embryo. The eggs in a mass turn this color almost simultaneously, about from eight to twelve hours before hatching. Through a lens the body of the fully-developed embryo is distinctly visible, and its distinct segmentation gives the egg a dark-ringed appearance, throughout its length. The embryo is erect, the setæ more or less visible as short irregular streaks of black, but the disposition of the legs is not distinct. The basal one-third of the egg is darker. The ocellar spots of the embryo are visible as a small group of three minute dots in a triangle on the latero-cephalic aspect (*i. e.*, on each side of the anterior end), and the tips of the mandibles between these two groups as two fainter red dots on the ventro-cephalic aspect of the egg. The two black papillar spots on the pronotum are also distinct, and the median line of the two posterior segments of the thorax. Just previous to eclosion, the egg is somewhat swollen at its cephalic end.

The egg-shell parts along the dorsal aspect from the apex down to about half its length, and the head of the larva at once appears. The body is gradually worked out until the legs are free, when the larva, holding itself erect by means of the unexcluded terminal segments, exercises the legs back and forth until they are strong and dry. At first, the legs are disposed along the ventum. The act of hatching varies in time, averaging from about 50 to 70 minutes. The larva then frees itself from the egg and rests upon the mass. It is then normal for instar I, excepting for the pale yellow color of the legs, ventum and the head and its appendages, which form a decided contrast to the dusky color of the dorsum.

The egg-shells are not eaten. Forty-six young larvæ, hatching during the first week of June, 1907, and starved in confinement, lived on an average of four and one half days, ranging from four to five days.

Each clutch of eggs was confined in darkness, under the cover of small paste-board boxes, and also in-doors, so that the period must be considered as not absolutely natural, though under the usual laboratory conditions. These conditions are stated in case it is shown in the future that the presence or absence of direct or indirect sunlight have the effect on the period of incubation of this insect attributed to them in regard to those of other animals. In nature, the eggs are seldom

or never exposed to the direct rays of the sun, being under a leaf, but it is a question whether the conditions of their usual environment are obtained in the laboratory.

PERIOD OF INCUBATION.

TABLE I.

PERIOD OF INCUBATION, MAY 24–JUNE 10, 1907.

Lot No.	No. Eggs.	Deposited.	Hatched.	Length of Instar.		Average Effective Temp. Degrees Fahr.
				Days.	Hours.	
1	5	3 p. m., May 24.	7 p. m., May 30.	6	4	20.2°
2	26	8 p. m., May 24.	10 p. m., May 30.	6	2	19.9
3	16	2 p. m., May 26.	3 p. m., June 3.	8	1	19.5
4	15	3 p. m., May 26.	2:30 p. m., June 3.	7	23½	19.5
5	34	1:30 p. m., June 1.	9 p. m., June 8.	7	7½	20.1
6	14	3 p. m. June 4.	2 p. m., June 10.	5	23	22.0
Totals.	110				997	121.2
Averages.				6.92		20.2

Duration of Postembryonic Instars.

In Table II the duration of the different stages after hatching are shown for a single generation, from May 25 to June 23. The larvæ were fed on various aphids which were supplied them in abundance, and they were confined separately under the conditions stated in regard to the eggs, as were also the pupæ.

The sums of effective temperature for the different individuals of this generation vary for over seventy degrees, when it appears that they should be very nearly alike, other conditions being equal. It would seem as if equal amounts of effective temperature should cause equal amounts of growth or development in individuals of the same age, providing food and other factors of environment are equal, but apparently there are also internal factors involved, causing certain individuals to deviate in either direction from the average. The individual instars vary considerably from a little less than two days to a little more than nine days, but this larger variation in the duration of separate instars or stages does not affect the length of the entire life-cycle, one stage generally making up what the other loses.

ADULTS IN CONFINEMENT.

A pair of mating adults captured on the foliage of blackberry at 11 A. M., May 24 and confined, produced but 17 eggs, the female dying on June 8. These eggs were deposited on May 24 (5) and

TABLE II.

POSTEMBRYONIC INSTARS FOR A SINGLE GENERATION, MAY 25–JUNE 23.
Hatched 10:15 A. M., May 25.

Larva No.	First Ecdysis. Instar I.	Second Ecdysis. Instar II.	Third Ecdysis. Instar III.	Pupation. Instar IV.	Emergence. Pupal Instar.	Sums.	Sums Effective Temp Degrees Fahrenheit.
1	11 a. m., May 31. 6 days, ¾ hr.	7 p. m., June 4. 4 days, 8 hrs.	8 p. m., June 9. 5 days, 1 hr.	6 a. m., June 17. 7 days, 10 hrs.	4 p. m., June 21. 4 days, 10 hrs.	27–5¾	682.4
2	Noon, June 3. 9 days, 1¾ hrs.	6 a. m., June 5. 1 day, 18 hrs.	7 p. m., June 11. 6 days, 13 hrs.	1 p. m., June 19. 7 days, 18 hrs.	5 a. m., June 23. 3 days, 16 hrs.	28–18¾	718.4
3	1 p. m., May 31. 6 days, 2¾ hrs.	7 a. m., June 6. 5 days, 18 hrs.	7 p. m., June 9. 3 days, 12 hrs	7 p. m., June 17. 8 days.	5 a. m., June 22. 4 days, 10 hrs.	27–18¾	682.4
4	2 p. m., May 31. 6 days, 3¾ hrs.	6 a. m., June 5. 4 days, 16 hrs.	10 a. m., June 11. 6 days, 4 hrs.	3 p. m., June 18. 7 days, 5 hrs.	7 a. m., June 22. 3 days, 16 hrs.	27–20¾	682.4
5	3 p. m., May 31. 6 days, 4¾ hrs.	[a]					
6	1 p. m., May 31. 6 days, 2¾ hrs.	6 a. m., June 4. 3 days, 17 hrs.	9 p. m., June 9. 5 days, 15 hrs.	5 p. m., June 16. 6 days, 20 hrs.	6 a. m., June 21. 4 days, 13 hrs.	26–19¾	647.9
7	5 a. m., June 1. 6 days, 18¾ hrs.	Noon, June 6. 5 days. 7 hrs.	4 p. m., June 11. 5 days, 4 hrs.	5 p. m., June 19. 8 days, 1 hr.	6 a. m., June 23. 3 days, 13 hrs.	28–19¾	718.4
8	10 a. m., 31 May.[b] 5 days, 23¾ hrs.						
Av.	6.58 days.	4.25 days.	5.34 days.	7.54 days.	4.04 days.	27.9 days.	688.65

[a] Died June 11. [b] Died during ecdysis.

26 (12) in the middle of the afternoon. A female captured on May 24, 11:30 A. M., and confined in the laboratory, and another one mating with a male, captured at 5 P. M., May 26, and similarly confined deposited eggs as follows:

Female No. 1 (Male Present).		Female No. 2 (Male Present).	
Date of Oviposition.	No. of Eggs.	Date of Oviposition	No. of Eggs.
6 P. M., May 24	15	P. M., June 1	19
2 " 26	16	" 5	11
1:30 " June 1	26	" 8	18
4 " 4	10	" 9	12
June 7	15	10 A. M., 10	16
P. M., 9	14	11	20
11	16	16	6
	Total 112	19	1
			Total 103

Female No. 1 died at about noon, June 21. The second pair died on June 22; they were observed mating on May 30, June 4, 5, 9, 10 and 12.

The eight adults emerging June 21–23 (Table II) were confined together in a large glass jar and supplied abundantly with food. They did not begin to mate until June 28, when one pair was observed; another pair was observed mating on July 5, and both of them were isolated. The first pair produced 37 eggs and then escaped on July 8. They mated again on July 2 and 7. The second pair produced no eggs and died for lack of food about July 12. They had mated a second time on July 6.

Class I, HEXAPODA.

Order IV, DIPTERA.

DESCRIPTIONS OF NEW MOSQUITOES FROM THE PANAMA CANAL ZONE.

By HARRISON G. DYAR AND FREDERICK KNAB,
WASHINGTON, D. C.

Our knowledge of the mosquito fauna of the Isthmus of Panama has heretofore amounted to practically nothing, but thanks to the collections recently made by Mr. August Busck, is now decidedly improved. Mr. Busck went to the Isthmus at the invitation of Dr. W.